REMARKS

Claims 1-9 and 11-13 remain in this application. Claims 10 and 14 have been canceled herein. Claims 1 and 11-13 have been amended. By these amendments, no new matter has been added. Reconsideration and review of the application is respectfully requested.

Before addressing the merits of the grounds of rejection, Applicant provides the following brief description of the invention. The present invention generally relates to a gasification system for carbon-containing materials that produces combustible gases with a calorific value of at least about 8,000 to about 10,000 kJ/m^3. Existing systems for producing gases with such calorific values typically involve exposing feed materials to temperatures of about 500 to about 900 degrees Celsius, requiring high technical outlay (e.g., transferring heat via the hot sand beds). The present invention avoids such technical outlay by utilizing a heat-pipe arrangement that directs heat generated in an external heat source (e.g., a fluidized-bed combustion chamber) to a fluidized-bed gasification chamber. More specifically, the invention provides a facility or system for producing combustible gas via allothermic steam gasification, comprising: (a) a pressure-supercharged, fluidized-bed gasification chamber; (b) a filter chamber connected to the gasification chamber; (c) an external heat source; and (d) a heat-pipe arrangement that transfers heat from the external heat source to a gasification bed in the gasification chamber.

The Examiner rejected Claims 1-14 under 35 U.S.C. § 103(a) as being unpatentable over Forney et al. (US 4,244,706) in view of Shaw (GB 1 599 398). The Examiner asserts that Forney et al. teaches a pressurized fluidized bed gasification chamber having means to supply feed materials to a gasification chamber, an external heat source, and means for removing heat from the gasifier (Col. 3, lines 5-41; col. 3, lines 64-68; and col. 4, lines 1-55). The Examiner concedes that Forney et al. do not teach a system having (a) a heat-pipe arrangement within the fluidized bed or (b)

pressure lock hoppers. The Examiner states that Forney et al. teach adding a slurry of carbonaceous material at about atmospheric pressure, thereby avoiding the need for lock hoppers. According to the Examiner, the use of lock hoppers would have been obvious to one of ordinary skill in the art since Forney et al. teach using a pump to increase the slurry pressure into the gasifier.

The Examiner asserts that Shaw teaches a fluidized bed gasification arrangement having heat pipes for transferring heat in/out of the fluidized bed. The Examiner states that: (a) the two compartment arrangement of the fluidized bed in Shaw provides a lower compartment that functions as a combustion bed and an upper compartment that functions as a reaction bed; and (b) the heat generated by the combustion process is absorbed by heat pipes and conveyed to the solid material in the upper compartment (Page 1, lines 1-51). The Examiner also states that Shaw teaches the use of lock hoppers in the removal of ash from the system. The Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the gasification system in Forney et al. with the fluidized bed arrangement in Shaw, because both Forney et al. and Shaw teach gasification using a fluidized bed.

Applicant traverses this rejection and the Examiner's characterization of the cited references. A closer examination of the primary prior art reference cited by the Examiner – namely, Forney et al. – reveals fundamental differences between the internal combustion gasification system in Forney et al. and the gasification system recited in Claim 1 which obtains the necessary heat from a heat source that is external to the gasification chamber. Forney et al. disclose a system wherein the heat for the gasification reaction is primarily generated *within* the gasifier (i.e., gasification chamber) by internal combustion (Col. 3, lines 50-63). In contrast, the facility recited in Claim 1 utilizes a heat-pipe arrangement for delivering heat from an external heat source to the fluidized bed in the gasification chamber. The Examiner acknowledges that Forney et al. do not disclose such a heat-pipe arrangement. Because the system in Forney et al.

generates heat within the gasifier, there is no need for heat pipes to introduce heat into the gasifier.

Furthermore, a *prima facie* rejection for obviousness requires: (1) a disclosure or suggestion of every element of the claim in the cited reference or references; (2) a suggestion or motivation, in the references or known to one skilled in the art, to modify or combine the references; and (3) a reasonable expectation of success. The suggestion to combine and the reasonable expectation of success must be found in the prior art. *In re* Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

With regard to the second requirement for the obviousness rejection, there must be a suggestion or motivation to modify or combine the references either in the references or known to one skilled in art. The Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the system in Forney et al. with the fluidized bed/heat pipe arrangement in Shaw, because both Forney et al. and Shaw teach gasification using a fluidized bed. However, as explained above, Forney et al. disclose a system that generates heat within a gasifier, such that there is no need for heat pipes to introduce heat into the gasifier from an external heat source. The fact that the system in Forney et al. relies on the "combustion of the carbonaceous material within the gasifier 35 [to increase] the temperature of the gas solids in the fluidized bed to a sufficient level for the water-gas reaction to occur" (Col. 3, lines 50-63) teaches away from Applicant's claimed invention which depends on a heat-pipe arrangement for the requisite heating of gas solids in the fluidized bed.

One might argue that the introduction of the heated slurry or additional steam into the system constitutes an external heat source. Assuming for the sake of argument that the heat carrying materials (i.e., the heated slurry and additional steam) constitute external heat sources, the heat carrying materials are introduced into the gasifier, and therefore carry heat energy into the gasifier. The efficiency of heat transfer into the gasifier/gasification chamber would actually be compromised if one were to attempt to

extract heat from the slurry and introduce the heat into the gasifier via a heat-pipe arrangement. Likewise, it would make little sense to produce steam, extract heat from the steam, liquefy the steam again, and introduce the extracted heat into the gasifier with heat pipes. It will be noted that Shaw discloses a system for running a combustion reaction to generate heat in a first fluidized bed, and then transferring the generated heat from the first fluidized bed to a second fluidized bed via one or more heat pipes (Page 2, lines 57-61). Shaw does not disclose a system that uses heat pipes to capture heat energy from steam in a first fluidized bed and transfer the captured heat energy to the second fluidized bed. In short, the fact that the heat sources in Forney et al. comprise (a) combustion within the gasifier, (b) heated slurry introduced into the gasifier, and (c) steam, while the heat pipes in Shaw transfer heat from combustion reactions outside the gasifier, all teach away from combining the system of Forney et al. with the heat pipe arrangement of Shaw.

With regard to the first requirement for the obviousness rejection, Forney et al., alone or in combination with Shaw, must identically teach or suggest every element of Claim 1, arranged as in Claim 1. *See* M.P.E.P. § 2143, at 2100-125 (Sept. 2004). Claim 1 recites a facility comprising "a pressure-supercharged fluidized-bed gasification chamber with a pressure-tight lock for supplying the feed materials that are to be gasified." The Examiner concedes that Forney et al. do not teach pressure lock hoppers, but states that Shaw teaches the use of lock hoppers in the removal of ash from the system. The use of lock hoppers for removing ash is entirely different from a pressure-tight lock for supplying the feed materials that are to gasified. As such, both Forney et al. and Shaw fail to teach or suggest a pressure-tight lock for supplying feed materials. Failing to disclose or suggest every limitation of Claim 1, Forney et al., alone or in combination with Shaw, does not support a *prima facie* case of obviousness. As such, the combination of these references fails to meet the first two requirements for an obvious rejection.

Claims 2-9 and 11-13, which depend from Claim 1, are deemed patentable for the same reasons stated above with respect to Claim 1, and because of the additional limitations set forth therein. Accordingly, Applicant respectfully requests that the rejection of Claims 1-9 and 11-13 be withdrawn.

In view of the foregoing, Applicant respectfully submits that Claims 1-9 and 11-13 are in condition for allowance. Reconsideration and withdrawal of the rejections is respectfully requested, and a timely Notice of Allowability is solicited. If it would be helpful to placing this application in condition for allowance, Applicant encourages the Examiner to contact the undersigned counsel and conduct a telephonic interview.

To the extent necessary, Applicant petitions the Commissioner for a three-month extension of time, extending to December 15, 2005, the period for response to the Office Action dated June 15, 2005. Our check in the amount of $1,020.00 is enclosed for the three-month extension of time pursuant to 37 CFR §1.17(a)(3). The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0639.

Respectfully submitted,

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